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**LTE;  
Location Measurement Unit (LMU) performance specification;  
Network based positioning systems in Evolved Universal  
Terrestrial Radio Access Network (E-UTRAN)  
(3GPP TS 36.111 version 13.0.0 Release 13)**



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650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

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Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

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# 1 Scope

The present document establishes the Location Measurement Unit (LMU) minimum UTDOA positioning requirement for the FDD and TDD mode of E-UTRAN.

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
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- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 36.305: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Stage 2 functional specification of User Equipment (UE) positioning in E-UTRAN".
- [3] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements".
- [4] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification".
- [5] 3GPP TS 36.459: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); SLM interface Application Protocol (SLmAP)".
- [6] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation".
- [7] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception".

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] apply.

### 3.1A Symbols

For the purposes of the present document, the following symbols apply:

$BW_{\text{Channel}}$	Channel bandwidth
$BW_{\text{SRS}}$	SRS bandwidth
$\hat{E}_s$	Received energy per RE (power normalized to the subcarrier spacing) during the useful part of the symbol, i.e. excluding the cyclic prefix, at the LMU antenna connector
$I_o$	The total received power density, including signal and interference, as measured at the UE antenna connector
$I_{ot}$	The received power spectral density of the total noise and interference for a certain RE (power integrated over the RE and normalized to the subcarrier spacing) as measured at the LMU antenna connector
$P_{\text{REFSENS}}$	The reference sensitivity power level
$T_{\text{SRS}}$	The SRS periodicity in ms